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THE NEARCTIC DORYCTINAE, X. THE GENUS *RHACONOTUS*
RUTHE (HYMENOPTERA: BRACONIDAE)

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ABSTRACT—A key and descriptions for the 9 species of Nearctic *Rhaconotus* are presented; 6 species are described as new, *atratus*, *badius*, *barri*, *brevicaudus*, *canadensis*, and *phalarus*.

The genus *Rhaconotus* Ruthe is a very distinctive group of species with slender, strongly sclerotized and sculptured bodies. The most significant feature which distinguishes them from nearly all other braconids is the structure of the abdomen; the first five terga form a strongly sculptured and rigid carapacelike structure under which the last three terga are retracted.

The species of *Rhaconotus* also have a characteristic biology in that they appear to all be parasites of larvae of coleopterous and lepidopterous borers in stems of herbs, shrubs, and grasses. The most common groups of plants from which species have been reared are the Compositae, Gramineae, Solanaceae, and Euphorbiaceae. The Nearctic species do not seem to be of any great economic significance, but several species are important parasites of borers in rice, sugar cane, and cotton in areas of the World where these crops are grown.

The genus contains 150 described species of which most occur in the Oriental and Ethiopian Regions. These areas contain extensive cultivated areas of rice, sugar cane, and cotton which seem to be the major hosts for the hosts of *Rhaconotus* species. In the Palearctic and Nearctic Regions the species appear to be concentrated but not restricted to the southern areas. No species have been recorded from the Neotropical Region, but the National Collection contains a few specimens of unnamed species from Mexico and Central America. The Nearctic Region contains nine species of which six are described below as new.

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Specimens for this study were received from the following institutions: University of Arizona, California Academy of Sciences, University of California at Riverside, Canadian National Collection (CNC), Florida State Collection of Arthropods, Iowa State University (ISU), University of Kansas, University of Michigan, Museum of Comparative Zoology (MCZ), Texas A & M University, and the U.S. National Museum (USNM). Scanning electron microscope time for this project was supported in part by the Electron Microscope Central Facility, Center of Materials Research, University of Maryland, College Park.

Genus *Rhaconotus* Ruthe

Rhaconotus Ruthe, 1854:349.

Type-species: *Rhaconotus aciculatus* Ruthe, monotypic; holotype deposited in British Museum (Natural History), London.

Hedysomus Foerster, 1862:238.

Type-species: *Hedysomus elegans* Foerster, monotypic and original designation; holotype deposited in Zoological Museum of Humboldt University, Berlin. Synonymy by Muesebeck and Walkley, 1951.

Hormiopterus Giraud, 1869:478.

Type-species: *Hormiopterus ollivieri* Giraud, monotypic; holotype deposited in National Museum of Natural History, Paris. Synonymy by Nixon, 1940.

Rhadinogaster Szépligeti, 1908:223.

Type-species: *Rhadinogaster testacea* Szépligeti, designated by Viereck, 1914; holotype deposited in Hungarian Natural History Museum, Budapest. Synonymy by Marsh, 1973.

Euryphrymnus Cameron, 1910:100.

Type-species: *Euryphrymnus testaceiceps* Cameron, monotypic; holotype deposited in Zoological Museum of Humboldt University, Berlin. Synonymy by Muesebeck and Walkley, 1951.

Diagnosis: Head cubical; notauli present but frequently weak; foretibia with row of 4–7 stout spines on anterior edge; all femora with a blisterlike swelling on upper surface just posterior to middle; hindcoxa with toothlike projection ventrally at base; forewings with 3 cubital cells, recurrent vein entering 2nd cubital cell at extreme base or rarely interstitial with 1st intercubitus, subdiscoideus interstitial with discoideus, medius sinuate; radiella and postnervellus of hindwing usually absent; forewings often marked with dark and light bands; 1st 5 abdominal terga strongly sclerotized and with sharp lateral margins, remainder of terga retracted beneath tergum 5 so that the abdomen appears carapacelike, all exposed terga with a predominating sculpture of deep striations or, in 1 species, punctations, transverse groove between terga 2 and 3 always crenulate; predominate sculpture of entire body coriaceous or reticulate with varying degrees of striation superimposed.

The closest relatives of *Rhaconotus* appear to be the genera *Spathius* Nees and *Platyspathius* Viereck by virtue of similar wing venations. But *Rhaconotus* can be readily recognized by its abdominal formation which separates it from all genera of the Doryctinae. Some authors have placed it in a separate tribe, but I think that this treatment only obscures its relationships with the other genera.

Several morphological characters are useful in recognizing species of *Rhaconotus*, the more important being the length of the ovipositor relative to the length of the forewing or the abdomen, the wing coloration, and the body sculpturing. The wing venation varies only slightly, but the wing pattern ranges from completely hyaline to banded with alternate dark and light transverse bands to dusky with irregular hyaline spots. The most important specific character is the sculpturing of the body. In defining the type of sculpturing I have used terms proposed by Eady (1968) in his paper on the microsculpture of Hymenoptera. In all species the body has a basic sculpture which is either coriaceous or reticulate. Coriaceous sculpturing gives the appearance of a cracked mud surface with the areas between cracks flat (fig. 7) or slightly convex (fig. 8); reticulate sculpturing is similar but the areas between cracks are concave (fig. 9). Occasionally there is a ground sculpture termed granulate which is similar to coriaceous except the raised areas are smaller and circular. Superimposed on these basic sculptures are various degrees of ridges, striae, or rugosities, such as striate-reticulate (fig. 10, 18), striate-coriaceous (fig. 8, 13), or strigose-reticulate (fig. 14, 16). Strigose sculpturing differs from striate in that the striae are irregular or wavy rather than straight and nearly parallel. Crenulate refers to a wide groove or furrow with transverse carinae at regular intervals, much like the prescutellar furrow (fig. 13).

The key that follows is to females only. Of the few males that I have seen, most are associated with a particular species with considerable difficulty. The males of *Rhaconotus*, as in most braconids, tend to be smaller and not as strongly or distinctly sculptured as the females so that they become very similar and hard to distinguish. The best way to determine the male of a particular species is by association with reared females.

KEY TO FEMALES OF NORTH AMERICAN *Rhaconotus*

- | | |
|---|---|
| 1. Forewing length (FWL) at least $3\frac{1}{2}\times$ ovipositor length (OL), usually 4 or $5\times$ | 2 |
| — FWL at most $3\frac{1}{2}\times$ OL, usually about $2\times$ | 5 |
| 2. First abdominal tergum wider than long at apex; antenna less than 30-segmented; sternaulus weakly or not crenulate | 3 |
| — First abdominal tergum longer than wide at apex; antenna more than 30-segmented; sternaulus strongly crenulate | 4 |

3. Body dark brown or black, legs brown; pronotum shorter than 1st flagellar segment and without distinct transverse carina *brevicaudus*, new species
- Head, prothorax, mesopleural disc, and abdominal terga 1 and 2 light brown, mesonotum, mesosternum, propodeum, and rest of abdominal terga dark brown, legs honey yellow; pronotum longer than 1st flagellar segment and with distinct transverse carina *canadensis*, new species
4. Body, including head, dark brown or black, hindfemur usually dark brown or black, darker than hindtrochanters; 3rd segment of radius of forewing usually about $1\frac{1}{3}\times$ longer than 2nd segment *atratus*, new species
- Body brown, head light brown or honey yellow, hindfemur and hindtrochanters honey yellow; 3rd segment of radius usually $1\frac{2}{3}$ to $1\frac{3}{4}\times$ longer than 2nd segment *badius*, new species
5. Wings with alternate dark and hyaline bands (fig. 4, 5), rarely weakly so; notauli shallow, often nearly absent, area where they meet usually with 3 or 4 longitudinal carinae (fig. 13); abdominal tergum 5 weakly coriaceous (fig. 11) 6
- Wings not noticeably banded, either hyaline (fig. 1) or dusky with irregular hyaline spots (fig. 2, 3); notauli deep, crenulate, strongly strigose where they meet (fig. 16); abdominal tergum 5 strongly sculptured, striae converging inwardly at apex (fig. 12), or at least granulations forming a circular swirl 7
6. FWL $3-3\frac{1}{2}\times$ OL; propodeum and abdominal terga 1 and 2 usually reticulate; color generally light brown *graciliformus* (Viereck)
- FWL $2\times$ OL or less; propodeum and abdominal terga 1 and 2 usually strigose-reticulate; color generally dark brown *fasciatus* (Ashmead)
7. Vertex strigose-reticulate (fig. 14) *cressoni* Muesebeck and Walkley
- Vertex reticulate 8
8. Mesopleuron strongly and deeply striate-coriaceous; wings dusky with hyaline spots (fig. 3) *phalarus*, new species
- Mesopleuron coriaceous; wings hyaline (fig. 1) *barri*, new species

Rhaconotus atratus Marsh, new species

Female Holotype: Length of body, 4 mm; ovipositor, 0.75 mm. *Color*: Body black; head with lighter face and spots around eyes; forelegs brown, foretibia dark brown with light basal ring, last tarsal segment black; mid- and hindlegs black except trochanters, basal ring on tibiae, and 1st 4 tarsal segments which are brown; basal antennal segments honey yellow, apical ones brown; wings banded, radial cell with hyaline spot at apex of stigma. *Head*: Entirely coriaceous to granulate; malar space $\frac{1}{2}$ eye height; temples slightly less than eye width; ocellular distance about $5\times$ diameter of lateral ocellus; antenna 35-segmented. *Thorax*: Pronotum coriaceous, longer than 1st flagellar segment, transverse carina strong, propleuron coriaceous, striate medially; proepisternum coriaceous; mesonotal lobes shallowly reticulate, notauli weak, crenulate anteriorly, with weak longitudinal carinae where they meet posteriorly (as in fig. 13); scutellar disc coriaceous; mesopleural disc shallowly reticulate, subalar groove and sternaulus crenulate; mesosternum coriaceous; propodeum horizontal, not declivous pos-

teriorly, weakly striate-reticulate with strong median basal carina. *Legs*: Foretarsus about $1\frac{1}{2}\times$ longer than foretibia, mid- and hindtarsi equal to mid- and hindtibiae respectively. *Wings*: Second segment of radius $6\times$ as long as 1st, 3rd segment $1\frac{1}{3}\times$ as long as 2nd; longest hairs on apical border of forewing about equal to length of 1st segment of radius. *Abdomen*: First tergum longer than apical width, strongly striate-reticulate; 2nd tergum strongly striate-reticulate; terga 3-5 coriaceous except some strong striations at base of each terga; ovipositor slightly shorter than combined lengths of terga 1 and 2, forewing length $3\frac{2}{3}\times$ ovipositor length.

Variation: Length of body, 3-4.5 mm; ovipositor, 0.5-1 mm; legs and head sometimes lighter brown; antenna 32- to 35-segmented; 3rd segment of radius $1\frac{1}{4}$ to $1\frac{1}{2}\times$ as long as 2nd segment.

Male: Essentially as in female; antenna 25- to 28-segmented; radial cell sometimes without hyaline spot at apex of stigma; propodeum and abdomen less strongly striate.

Holotype Female: Hanover, New Hampshire, K. W. Cooper, 8-23-30? (label difficult to read). Deposited in USNM.

Paratypes: 4 ♀♀, 2 ♂♂, Patuxent, Maryland, 1 ♀, H. C. Owens, 1953 (USNM); Holliston, Massachusetts, 1 ♀, 1 ♂, 20-VII, 1-IX, N. Banks (MCZ); Douglas Lake, Cheboygan Co., Michigan, 1 ♀, Aug. 2, 1950, R. I. Sailer (USNM); 5 mi SE Pequot Lakes, Crow Wing Co., Minnesota, 1 ♀, July 4, 1957, J. L. Laffoon (ISU); Bear Mt., Palisades Pk., New York, 1 ♂, VI-8-41 (MCZ).

This species is similar to *brevicaudus* but is distinguishable by its longer first abdominal tergum, longer antenna, coriaceous face, wing coloration, and shorter hair on edge of forewing. It is also similar to *fasciatus* but is distinguished by its shorter ovipositor.

Rhaconotus badius Marsh, new species

Female Holotype: Length of body 3.5 mm; ovipositor, 0.75 mm. *Color*: Head light brown; basal antennal segments honey yellow, apical ones brown; thorax and abdomen dark brown, proepisternum, pronotum, and apical edges of terga 3-5 light brown; legs honey yellow, hindecoxa slightly darker, hindtibia slightly darker on apical $\frac{1}{2}$, apical segment of all tarsi brown; wings banded, radial cell with small hyaline spot at apex of stigma. *Head*: Entirely coriaceous; malar space $\frac{1}{2}$ eye height; temples less than eye width; ocellocular distance $5\times$ diameter of lateral ocellus; antenna 32-segmented. *Thorax*: Pronotum coriaceous, about as long as 1st flagellar segment, transverse carina distinct, propleuron coriaceous, strongly striate medially; mesonotal lobes coriaceous, notauli weak, crenulate anteriorly with longitudinal striations where they meet posteriorly; scutellar disc coriaceous; mesopleural disc coriaceous, subalar groove weakly crenulate, sternaulus crenulate; propodeum horizontal, not declivous posteriorly, striate-reticulate with distinct median basal carina. *Legs*: Foretarsus $1\frac{1}{3}\times$ as long as foretibia, mid- and hindtarsi equal to mid- and hindtibiae respectively. *Wings*: Second segment of radius $4\frac{1}{2}\times$ as long as 1st segment, 3rd segment

$1\frac{1}{3}\times$ as long as 2nd segment. *Abdomen*: First tergum longer than apical width, strongly striate-reticulate; 2nd tergum strongly striate-reticulate; terga 3–5 coriaceous except some strong striations at base of each terga; ovipositor slightly longer than combined lengths of terga 1 and 2, forewing length $3\frac{2}{3}\times$ as long as ovipositor.

Variation: Length of body, 3.5–4 mm; antenna 32- to 33-segmented; 3rd segment of radius $1\frac{1}{2}$ to almost $2\times$ as long as 2nd segment.

Male: Unknown.

Holotype Female: Richmond, Indiana, W. J. Philips colr. Deposited in USNM.

Paratypes: 12 ♀♀, same data as type, 4 ♀♀ (USNM); Lethbridge, Alberta, 2 ♀♀, VII-8-56, VI-24-56, O. Peck, (CNC); Scandia, Alberta, 3 ♀♀, VII-9 1956, VII-11-56, VI-26-56, O. Peck, swept from range grass (CNC); Lincoln, Nebraska, 2 ♀♀, F. M. Webster and G. I. Reeves colrs. (USNM); Lucern, Lake Chelan, Washington, 1 ♀, 29 July 19, A. L. Melander (MCZ).

This species is similar to *fasciatus* but is distinguished by its shorter ovipositor; also similar to *atratus* but is distinguished by its color and wing venation.

Rhaconotus barri Marsh, new species

fig. 1

Female Holotype: Length of body, 3.5 mm; ovipositor, 2 mm. *Color*: Head, basal antennal segments, and legs light brown; apical antennal segments, thorax and abdomen dark brown; wings nearly entirely hyaline (fig. 1). *Head*: Height equal to width, cheeks not strongly sloping inward; vertex and frons shallowly reticulate, face and temples coriaceous, cheeks smooth; malar space about $\frac{2}{3}$ eye height; temples slightly narrower than eye width; ocellular distance about $3\frac{1}{2}\times$ diameter of lateral ocellus; antenna 23-segmented. *Thorax*: Pronotum and proepisternum coriaceous, propleuron strigose-reticulate, transverse pronotal carina weak; mesonotal lobes coriaceous, notauli deep, crenulate anteriorly, meeting posteriorly in narrow rugose area; scutellar disc coriaceous, not carinate laterally; mesopleural disc coriaceous, subalar groove wide and strongly crenulate, sternaulus rugose; mesosternum coriaceous; propodeum longitudinally striate-reticulate, not horizontal, gently curving from base to apex. *Legs*: Foretarsus $1\frac{1}{2}\times$ as long as foretibia, midtarsus $1\frac{1}{3}\times$ as long as midtibia, hindtarsus slightly shorter than hindtibia. *Wings* (fig. 1): More sparsely hairy than other species; 2nd segment of radius $3\frac{1}{2}\times$ as long as 1st segment. *Abdomen*: Terga 1–5 striate-reticulate, striae on tergum 5 converging toward middle at apical edge (as in fig. 12); terga 3 and 4 coriaceous along apical border; 1st tergum as wide at apex as long; 5th tergum not notched apically; ovipositor as long as abdomen, forewing length about $1\frac{1}{3}\times$ as long as ovipositor.

Variation: Length of body, 3–4 mm; ovipositor 1.5–2 mm; antenna 20- to 23-segmented.

Male: Essentially as in female, propodeum and abdomen not as strongly striate, occasionally only reticulate.

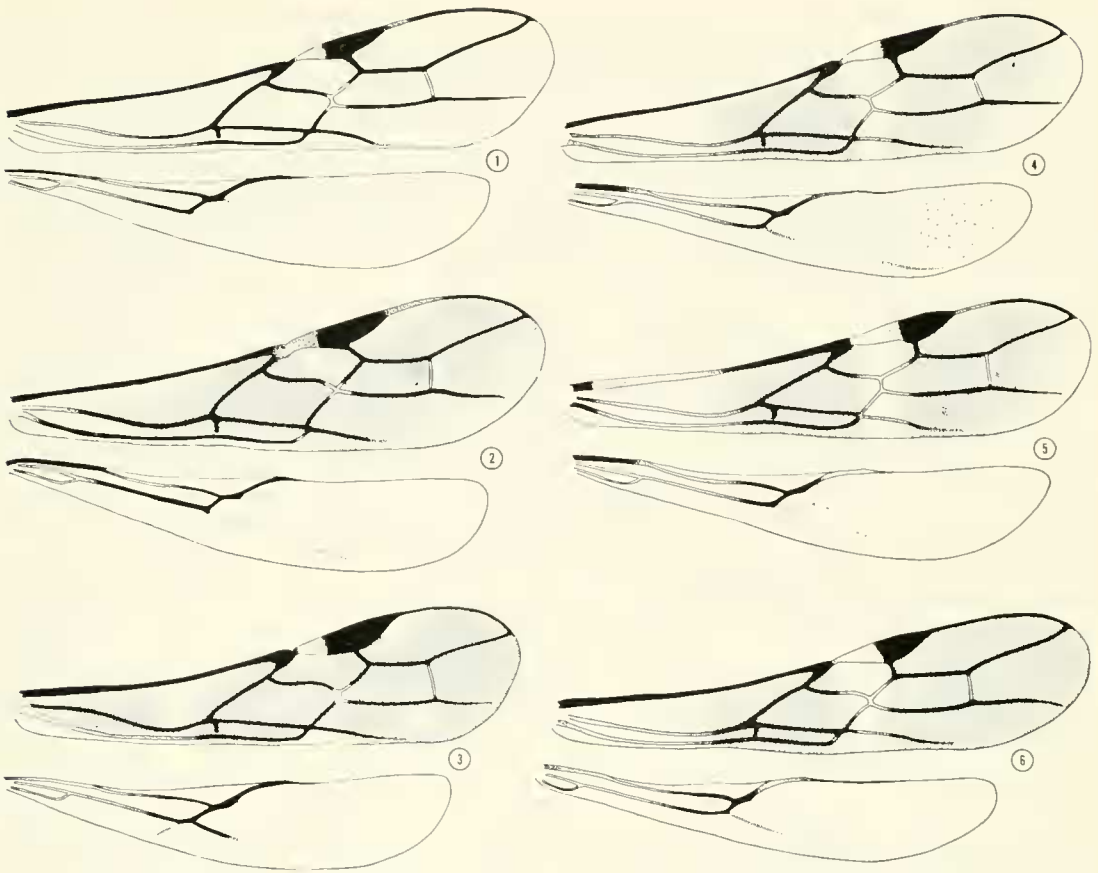


Fig. 1-6. Fore- and hindwings of *Rhaconotus* species. 1, *barri*. 2, *cressoni*. 3, *phalarus*. 4, *fasciatus*. 5, *graciliformis*. 6, *brevicaudus*. (Stippling represents wing coloration; wing hairs are not illustrated).

Holotype Female: 12 mi. W. Mt. Home, Elmore Co., Idaho, VI-1955, reared from *Eurotia lanata* infested with *Acmaeodera pulchella*, W. F. Barr. Deposited in USNM.

Paratypes: 2 ♀♀, 3 ♂♂ same data as type. (USNM).

This species is similar to *cressoni* but is distinguished by its shorter antennae, reticulate vertex, and longer ovipositor.

Biology: This species was reared from a sage brush, *Eurotia lanata* (Pursh) Moq. which was infested with the buprestid *Acmaeodera pulchella* Herbst. Judging from the host records of other North American *Rhaconotus* species, it is likely that *barri* is a parasite of this beetle.

Rhaconotus brevicaudus Marsh, new species

fig. 6

Female Holotype: Length of body, 2.5 mm; ovipositor, 0.5 mm. *Color*: Thorax and abdomen very dark brown, almost black, head dark brown, legs and antennae brown; wings banded, radial cell entirely infuscated (fig. 6). *Head*: Entirely finely coriaceous, face with raised smooth median area; malar space about $\frac{1}{2}$

eye height, temples about $\frac{2}{3}$ eye width; ocelli small, ocellocular distance about $5\times$ diameter of lateral ocellus; antenna 25-segmented. *Thorax*: Pronotum coriaceous, shorter than 1st flagellar segment, transverse carina absent, propleuron coriaceous; mesonotal lobes and scutellar disc coriaceous, notauli very weak, hardly impressed posteriorly, weakly crenulate anteriorly; mesopleural disc coriaceous, subalar groove and sternaulus shallow, weakly crenulate; mesosternum coriaceous; propodeum declivous posteriorly, reticulate, median basal carina present. *Legs*: Foretarsus about $1\frac{1}{3}\times$ longer than foretibia, midtarsus equal to midtibia, hindtarsus slightly longer than hindtibia. *Wings* (fig. 6): Second segment of radius $5\times$ as long as 1st segment; longest hairs on apical border of forewing longer than 1st segment of radius. *Abdomen*: First tergum wider at apex than long, finely striate-reticulate; 2nd tergum striate-reticulate; terga 3–6 coriaceous with some striations at base and smooth at apex; ovipositor about as long as 1st tergum, forewing length about $5\times$ as long as ovipositor.

Variation: Length of body, 2–3 mm; ovipositor, 0.5–0.75 mm; antenna 24–to 28-segmented; propleuron sometimes with a few striations medially; propodeum with some weak striations dorsally.

Male: Unknown.

Holotype Female: Holliston, Massachusetts, VIII-11, N. Banks. Deposited in USNM.

Paratypes: 3 ♀♀, same data as holotype, 2 ♀♀ (USNM, MCZ); Brighton, Ontario, 1 ♀, 17-VII-56, John C. Martin (CNC).

This species is similar to *atratus* but is easily distinguished by its shorter first abdominal tergum, shorter antenna, smooth median tubercle on face, wing coloration, and longer hair on edge of forewing.

Rhaconotus canadensis Marsh, new species

Female Holotype: Length of body, 3 mm; ovipositor, 0.5 mm. *Color*: Head, prothorax, mesopleural disc, and abdominal terga 1 and 2 brown, mesonotum, mesosternum, and remainder of abdomen dark brown, legs and basal antennal segments honey yellow, apical antennal segments brown; wings nearly hyaline, weakly banded, stigma with hyaline spot on apical $\frac{1}{2}$. *Head*: Entirely coriaceous, face smooth medially; malar space about $\frac{2}{3}$ eye height; temples slightly less than eye width; ocelli small, ocellocular distance about $5\times$ diameter of lateral ocellus; antenna 27-segmented. *Thorax*: Pronotum coriaceous, longer than 1st flagellar segment, transverse carina present, propleuron coriaceous, weakly strigose medially; mesonotal lobes shallowly reticulate, notauli shallow, weakly crenulate anteriorly, meeting posteriorly in shallow striate area; mesopleural disc coriaceous, subalar groove and sternaulus shallow, narrow, weakly crenulate; propodeum reticulate with some striations dorsally on apical $\frac{2}{3}$, median basal carina distinct. *Legs*: Foretarsus $1\frac{1}{2}\times$ as long as foretibia, midtarsus equal to midtibia, hindtarsus equal to hindtibia. *Wings*: Second segment of radius $5\times$ as long as 1st segment; longest hairs on apical border of forewing equal to length of 1st segment of radius. *Abdomen*: First tergum wider at apex than long, longitudinally striate-reticulate; 2nd tergum striate-reticulate; terga 3–5

coriaceous except for striations at base; ovipositor about as long as 1st abdominal tergum, forewing length $5\frac{1}{2}\times$ as long as ovipositor.

Male: Essentially as in females; antenna 25- to 28-segmented; 1st abdominal tergum longer than wide at apex.

Holotype Female: St. Victor, Saskatchewan, 49 20', 105 54', 27-V-1955, J. R. Vockeroth, among grass roots on dry prairie. Deposited in CNC.

Paratypes: 2 ♂♂, same data as type (USNM).

This species is similar to *brevicaudus* but is distinguished by its color and structure of pronotum.

Rhaconotus cressoni Muesebeck and Walkley

fig. 2, 10, 12, 14, 16

Hormius? *aciculatus* Cresson, 1872:190. Preoccupied in *Rhaconotus* by *aciculatus* Ruthe, 1854. Holotype female in USNM.

Hormiopterus aciculatus (Cresson): Ashmead, 1893:44.

Rhaconotus cressoni Muesebeck and Walkley, 1951:281. New name for *aciculatus* Cresson.

Female: Length of body, 4–5 mm; ovipositor, 1.5–3 mm. *Color*: Head, thorax, and abdomen varying from reddish brown to dark brown or black, apical edges of abdominal terga 3–5 usually light brown; legs brown; basal antennal segments light brown or honey yellow, apical 10–15 segments black; wings infuscated (fig. 2), less so on basal $\frac{1}{2}$, hyaline spots on costal margin of radial cell, base of stigma, middle of 1st cubital cell, base of 2nd discoidal cell, and along 2nd intercubitus. *Head* (fig. 14): Slightly wider than high, cheeks sloping strongly inward; face and temples coriaceous, vertex strigose-reticulate, frons rugose-reticulate, vertex and frons sometimes only weakly strigose or rugose; face medially with smooth raised area below antennae; malar space about $\frac{2}{3}$ eye height; temples slightly less than eye width; antenna 32- to 36-segmented; ocellular distance $4-4\frac{1}{2}\times$ diameter of lateral ocellus. *Thorax*: Pronotum and proepisternum coriaceous, propleuron striate-reticulate, transverse pronotal carina weak; mesonotal lobes reticulate, notauli deep, crenulate anteriorly, meeting posteriorly in strongly strigose-reticulate or rugose-reticulate area (fig. 16); scutellar disc coriaceous, occasionally rugose-coriaceous, carinate laterally; mesopleural disc reticulate, becoming strigose anteriorly and posteriorly and occasionally entirely striate-reticulate; subalar groove and sternaulus strongly crenulate; mesosternum coriaceous; propodeum strongly striate-reticulate. *Legs*: Foretarsus about $1\frac{1}{2}\times$ as long as foretibia, midtarsus equal to midtibia, hindtarsus equal to hindtibia. *Wings* (fig. 2): Second segment of radius $3-3\frac{1}{2}\times$ as long as 1st segment; recurrent vein interstitial with 1st intercubitus, or entering base of 2nd cubital cell at extreme base. *Abdomen* (fig. 10, 18): Terga 1–5 strongly longitudinally striate-reticulate (under high power, the reticulate areas between the striae sometimes appear like fish scales), striae on tergum 5 converging toward middle at apex (fig. 12), if these striae weak or absent, then reticulate

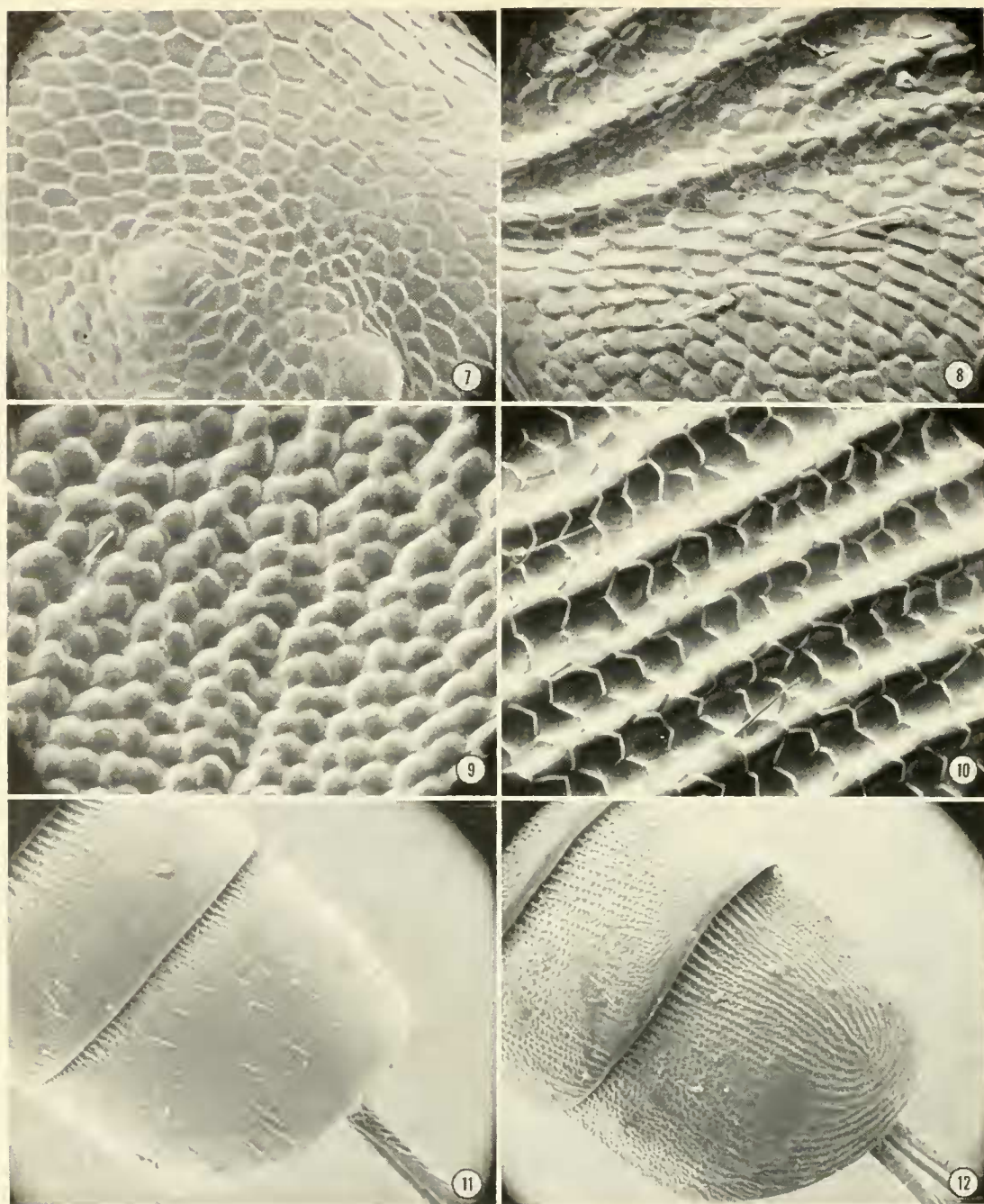


Fig. 7-12. Microsculpture of *Rhaconotus* species. 7, *graciliformis*, vertex, $\times 640$. 8, *fasciatus*, mesonotum, $\times 640$. 9, *fasciatus*, abdominal tergum 2, $\times 600$. 10, *cressoni*, abdominal tergum 1, $\times 650$. 11, *fasciatus*, abdominal terga 4 and 5, $\times 64$. 12, *cressoni*, abdominal terga 4 and 5, $\times 64$.

sculpturing converging or swirling on apical part of tergum; 1st tergum slightly wider at apex than long; 5th tergum usually broadly notched medially; ovipositor about as long as abdomen beyond tergum 1, forewing length $2-3\times$ as long as ovipositor, usually about $2\frac{1}{2}\times$.

Male: Essentially as in female.

Type-locality: Texas, probably Bosque Co.

Distribution: Maryland south to Florida, west to Kansas, Nevada, and California; Mexico.

This species is similar to *barri* but is recognized by its strigose vertex and shorter ovipositor. It is also similar to *phalarus* but is distinguished by its strigose vertex.

Biology: Several specimens were reared from *Cylindrocopturus adpersus* (Lec.) and *Lixus scrobicollis* Boh. Other specimens were reared from unknown hosts in various genera of Compositae such as *Artemisia*, *Ambrosia*, *Helianthus*, and *Vernonia*.

Rhaconotus fasciatus (Ashmead)

fig. 4, 8, 9, 11, 13, 17

Hormiopterus fasciatus Ashmead, 1893:43. Holotype female in USNM.

Rhaconotus fasciatus (Ashmead): Muesebeck and Walkley, 1951:181.

Female: Length of body, 3–4.5 mm; ovipositor, 1–1.5 mm. *Color*: Head brown; thorax usually dark brown or black, occasionally light brown; abdomen dark brown or black, basal segments occasionally light brown; legs brown, occasionally yellow, basal ring of tibiae and tarsal segments 1–4 light brown to yellow; basal antennal segments honey yellow, apical ones brown; wings banded (fig. 4). *Head*: Entirely shallowly reticulate; malar space $\frac{3}{4}$ eye height; temples slightly less than eye width; ocellular distance about $4\times$ diameter of lateral ocellus; antenna 33- to 40-segmented. *Thorax*: Prothorax coriaceous, propleuron weakly striate posteriorly, transverse carina on pronotum weak but distinct; mesonotal lobes and scutellar disc coriaceous, notauli shallow, slightly crenulate anteriorly, meeting posteriorly in shallow area with 3 or 4 short carinae (fig. 13); mesopleural disc coriaceous, subalar groove and sternaulus crenulate, the latter sometimes weakly; propodeum horizontal, reticulate, striate-reticulate dorsally near apex and laterally. *Legs*: Foretarsus about $1\frac{3}{4}\times$ as long as foretibia, midtarsus slightly longer than midtibia, hindtarsus slightly longer than hindtibia. *Wings* (fig. 4): Second segment of radius about $4\times$ as long as 1st. *Abdomen* (fig. 17): First tergum longer than wide at apex, striate-reticulate; 2nd tergum striate-reticulate; tergum 3 striate-coriaceous on basal $\frac{2}{3}$, coriaceous on apical $\frac{1}{3}$; terga 4 and 5 coriaceous with some striations at base (fig. 11), tergum 5 broadly emarginate medially at apex; ovipositor longer than length of terga 1–3, forewing length about $1\frac{3}{4}\times$ as long as ovipositor.

Male: Essentially as in female.

Type-locality: Riley Co., Kansas (from label). Ashmead states that the type is from Manhattan, Kansas.

Distribution: Maryland south to Florida, west to Iowa and Texas.

This species is similar to *graciliformis* but is distinguished by its longer ovipositor and striate propodeum and abdomen.

Biology: I have seen specimens that were reared from *Conotrachelus* sp. in stems of *Euphorbia*, from *Lixus concavus* Say, and from unknown hosts in herbaceous plants of the genera *Solidago*, *Iva*, and *Solanum*.

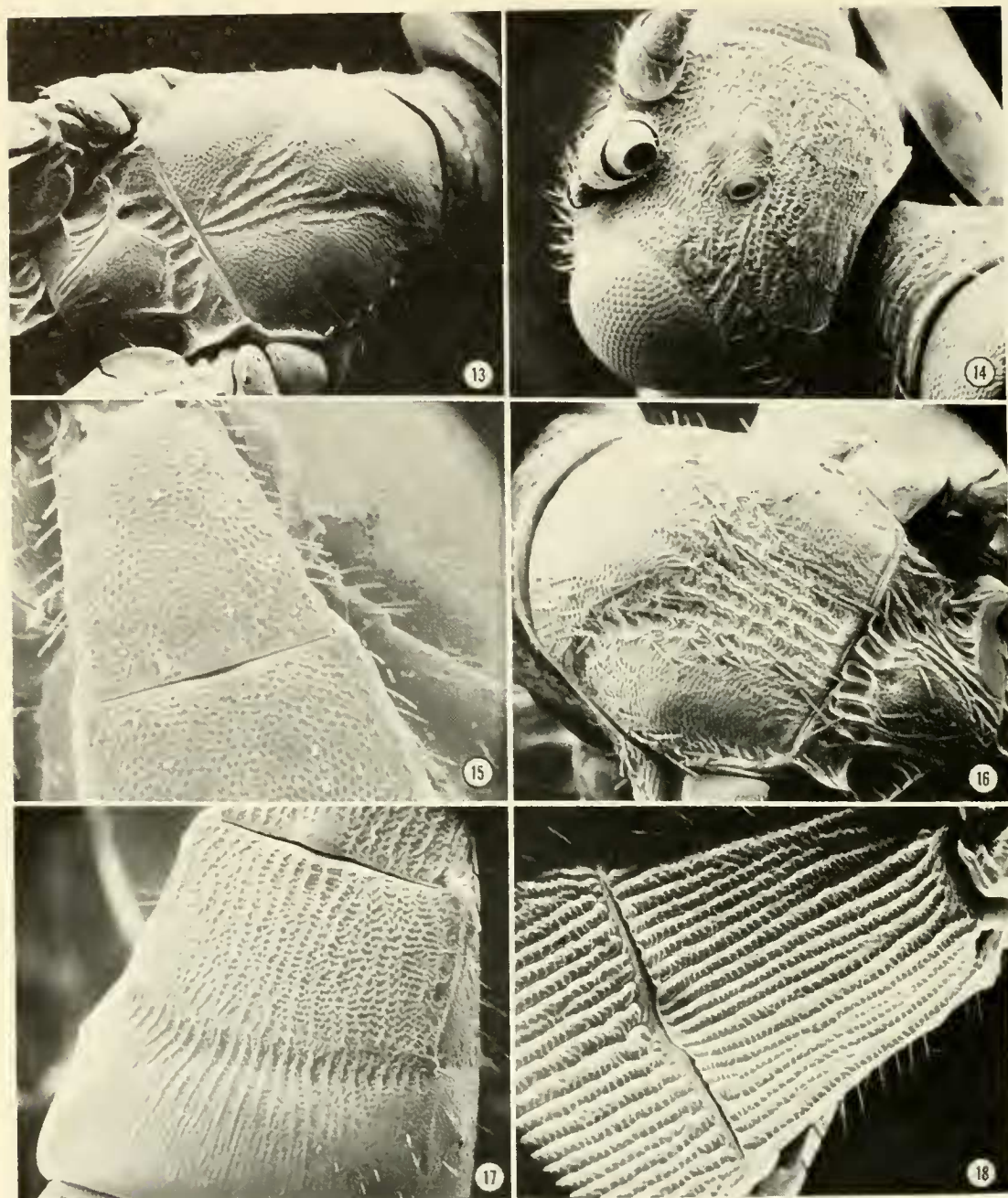


Fig. 13-18. Microsculpture of *Rhaconotus* species. 13, *fasciatus*, mesonotum, $\times 130$. 14, *cressoni*, vertex, $\times 130$. 15, *graciliformus*, abdominal terga 1 and 2, $\times 116$. 16, *cressoni*, mesonotum, $\times 130$. 17, *fasciatus*, abdominal terga 2 and 3, $\times 120$. 18, *cressoni*, abdominal terga 1 and 2, $\times 130$.

Rhaconotus graciliformus (Viereck)
fig. 5, 7, 15

Hormiopterus graciliformus Viereck, 1911:183. Lectotype female in USNM.
Rhaconotus graciliformus (Viereck): Muesebeck and Walkley, 1951:181.

Female: Length of body, 2.5-3.5 mm; ovipositor, 0.5-1 mm. *Color*: Head light brown, occasionally honey yellow; thorax and abdomen brown to dark

brown; legs brown to honey yellow, last tarsal segment dark brown; basal antennal segments yellow, apical ones brown; wings banded (fig. 5). *Head*: Very finely coriaceous; malar space about $\frac{1}{2}$ eye height; ocellocular distance about $4\times$ diameter of lateral ocellus; antenna 25- to 32-segmented. *Thorax*: Prothorax finely coriaceous, propleuron weakly striate medially; mesonotal lobes and scutellar disc weakly coriaceous, notauli shallow, weakly crenulate anteriorly, meeting posteriorly in shallow area with 2 or 3 short carinae; mesopleural disc coriaceous, sternaulus and subalar groove weakly crenulate; mesosternum weakly coriaceous; propodeum horizontal, usually entirely punctate or reticulate, with a short stub of median carina at base, occasionally striate laterally. *Legs*: Foretarsus about $1\frac{3}{4}\times$ as long as foretibia; midtarsus equal in length to midtibia; hindtarsus slightly longer than hindtibia. *Wings* (fig. 5): Second segment of radius about $5\times$ as long as 1st segment. *Abdomen* (fig. 15): First tergum longer than wide at apex, punctate or reticulate, occasionally with few striations; 2nd tergum punctate or reticulate; terga 3 and 4 striate reticulate; tergum 5 punctate or reticulate with striations basally; ovipositor as long as combined lengths of terga 1 and 2, forewing $3\text{--}3\frac{1}{2}\times$ as long as ovipositor.

Male: Essentially as in female.

Lectotype Female: "Wellington, Kansas, T. H. Parker collector, Webster no. 5473, Cage no. 119, Type no. 13500 USNM, *Hormiopterus graciliformis* Vier. Type ♀." Apparently Viereck had six specimens before him when he described this species. Only four of these are in the USNM collection, and I have designated the female above as the lectotype.

Distribution: Maryland south to Florida, west to Iowa, Colorado, and Arizona; North Dakota, Alberta.

This species is similar to *fasciatus* but is distinguished by its shorter ovipositor and punctate propodeum and abdomen.

Biology: The original description states "reared from an eurytomid in *Agropyron*" but this reference to a chalcid host is certainly an error. Several other specimens were reared from unknown hosts in *Muhlenbergia* which indicates that this species might be restricted to borers in grass stems.

Rhaconotus phalarus Marsh, new species

fig. 3

Female Holotype: Length of body, 5 mm; ovipositor, 1.5 mm. *Color*: Head, thorax, and abdomen black except head behind eyes and apices of abdominal terga 3–5 which are brown and tegulae which are yellow; basal antennal segments yellow, apical ones dark brown; fore- and midlegs brown except their trochanters, tibiae at base, and tarsal segments 1–4 which are honey yellow, hindlegs black except trochanters, tibia on middle $\frac{1}{2}$, and tarsal segments 1–4 which are brown, basal ring of tibiae yellow; forewings infuscated, with white hyaline spots (fig. 3). *Head*: Vertex and frons reticulate, temples and face coriaceous; malar space less than $\frac{1}{2}$ eye height, temples $\frac{1}{2}$ eye width; ocellocular distance $2\frac{2}{3}\times$ as long as lateral ocellus; antenna at least 34-segmented (both broken in type). *Thorax*: Propleuron deeply striate-coriaceous, these striations

extending over posterior $\frac{1}{2}$ of pronotum, anterior $\frac{1}{2}$ of pronotum and anterior edge of propleuron coriaceous, proepisternum coriaceous; mesonotal lobes finely reticulate, notauli deeply crenulate anteriorly, meeting posteriorly in a wide deeply striate area which covers posterior $\frac{1}{2}$ of mesonotum, notauli with long gold hair along their course, middle mesonotal lobe with a shallow crenulate longitudinal groove along its midline, lateral lobes crenulate or striate laterally at beginnings of notauli; scutellar disc coriaceous, prescutellar furrow with 5 strong carinae separated by deep grooves; entire mesopleuron deeply striate-coriaceous, sternaulus not crenulate but represented by a deeper groove; mesosternum coriaceous; propodeum deeply striate-coriaceous, becoming rugose-coriaceous at apex. *Legs*: Foretarsus $1\frac{2}{3}\times$ as long as foretibia, midtarsus equal to midtibia, hindtarsus slightly shorter than hindtibia. *Wings* (fig. 3): Second segment of radius $3\times$ as long as 1st segment. *Abdomen*: All terga strongly striate-coriaceous, terga 3 and 4 smooth on apical edge, targa 4 and 5 coriaceous at base, striae on tergum 5 converging toward middle at apex, apical edge of tergum 5 very slightly emarginate medially; ovipositor about as long as length of terga 1-3, forewing length $2\frac{1}{3}\times$ as long as ovipositor.

Male: Unknown.

Holotype Female: Cameron County, Texas, 8-3-28, R. H. Beamer. Deposited in USNM. Known only from the holotype.

This species is distinct from all other North American species and is similar to other species from Central and South America. The very strongly and deeply sculptured body and the maculated wings will easily separate it from all other species. The specific name is from the Greek *phalaros* which means white-spotted in reference to the spotted wings.

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A NEW COMBINATION IN BRUCHIDAE (COLEOPTERA)

Maurice Pic (1931. Bull. Soc. Linn. Lyon 10:139) described from "Bresil" *Bruchus subaenescens* which was later placed in *Acanthoscelides* by Blackwelder (1946. U.S. Natl. Mus. Bull. 185:761). Pic's collection, now at the Museum National d'Histoire Naturelle in Paris, contains 1 ♀ specimen bearing a handwritten label "*subaenescens* Pic" and his usual small, orange "type" label, but the locality label is partly illegible. I interpret the last as "Corumb" which probably indicates Corumba in Mato Grosso. Other specimens paired with it and conspecific with it are labeled "Bresil" and "*Bruchus subaenescens mihi*" in Pic's handwriting. Although there is some question as to the interpretation of the locality label, the specimen is marked in Pic's usual manner, therefore I regard it to be the holotype and have so labeled it. No mention of other specimens appears in his description.

The correct name for this species is *Sennius subaenescens* (Pic) NEW COMBINATION. Specimens from Cundinamarca Department, Colombia, have been deposited in the collection of the United States National Museum of Natural History, Washington, D.C., courtesy of Dr. Ingeborg Zenner de Polania. Known host plants are *Cassia tomentosa* Mutis ex L. and *Cassia viarum* Little (formerly *Cassia velutina* Britton & Killip), both grown as ornamental plants in Colombia. Studies are underway on the life-history of this bruchid.

Sennius subaenescens does not fit easily into any of the species groups outlined in a recent taxonomic study of the genus for North America (Johnson & Kingsolver. 1973. U.S. Dep. Agr. Tech. Bull. 1462.) and may represent a separate group.

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